

DESCRIPTIONS OF NEW SPECIES OF SHELLS, CHIEFLY  
BUCCINIDÆ, FROM THE DREDGINGS OF THE U. S. S.  
"ALBATROSS" DURING 1906, IN THE NORTHWEST-  
ERN PACIFIC, BERING, OKHOTSK, AND JAPANESE  
SEAS

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The waters described in the title of this paper are certainly the metropolis of the mollusks related to *Buccinum*, *Chrysodomus*, and *Volutopsius*, and from recent investigations appear to have been so since Eocene times. No other part of the world can compare with this region for the number of species indigenous to it. The latest monograph of the genus *Buccinum* includes 71 nominal species, of which 36, or one-half, are from the North Pacific region, while 35 are known from the whole of the rest of the world. To this 36, 24 are added in the present paper, making 60 in all, which by no means exhausts the fauna, since at least half a dozen other species have been added to the list since the publication of the monograph by Kobelt above alluded to. The richness in the subfamily *Chrysodominae* is probably quite as great.

There are about fifteen arctic species of *Buccinum* which are circumpolar in distribution which have not been counted in the above enumeration. Of these nine also occur in Bering Sea and vicinity, making a total known *Buccinum* population of about 75 species.

The common European species, *B. undatum* and *Chrysodomus antiquus*, do not appear at all on the Pacific side, though related forms have frequently erroneously been so named by hasty authors.

No doubt the collection made in 1906, when thoroughly studied, will add still more to this series, for more than half the jars have not yet been examined at all. The presence in the Okhotsk Sea of a large number of local species was rather unexpected, as the conditions are strictly arctic in this sea for the most part.

It is noticed that many of the species of the east side of Bering Sea have not yet turned up in the collection, and also that those which do occur on the Asiatic side attain a larger size than any of the same species yet dredged on the American coast.

Illustrations are in preparation and a final report will include the previously known species and many details which are withheld for the present.

## Genus PLEUROTOMELLA Verrill

**PLEUROTOMELLA SIMPLICISSIMA** Dall, n. sp.

Shell small for the genus, smooth, polished, pale straw-color over a chalky substratum, with about six whorls; nucleus eroded, subsequent whorls turriculate with an angular shoulder; suture distinct, not appressed, the whorl in front of it to the shoulder flat, below the shoulder moderately rounded; incremental lines visible but feeble; under a lens obsolete irregular spiral lines are perceptible, but to the naked eye the shell seems smooth; aperture narrow, the anal sulcus wide and shallow, beginning at the suture and extending to the shoulder, after which the outer lip is roundly arcuate forward, receding later to the canal; aperture milk-white, a slight glaze on the body and pillar; columella short, straight, obliquely truncate in front; canal short, wide, not recurved, outer lip thin, sharp. Lon. of shell, 25; of last whorl, 16; of aperture, 11.5; maximum diameter, 9 mm. Operculum absent.

Station 5050, in 1800 fathoms, northeast of Yesso, Okhotsk Sea, September 29, 1906. U. S. Nat. Mus., 110,442.

A very simple yet pretty form, which is probably a *Pleurotomella*.

## Genus BUCCINUM Linné

**BUCCINUM STRIATISSIMUM** Sowerby

*Buccinum striatissimum* SOWERBY, Ann. Mag. N. Hist., ser. VII, vol. IV, p. 370, fig. 1, November, 1899.

This fine species is rather abundant in the dredgings, having been obtained on the south coast of Yesso, Tsugaru Strait, the Sea of Japan, and the southwest coast of Korea, in from 50 to 568 fathoms. Until the series was compared I was inclined to suspect that this species was identical with the following one, but a study of the series leads me to conclude that, though extremely similar in surface characters and general appearance, the present species can always be distinguished by its rounder whorls and more deeply constricted sutures. It reaches a length of some 120 and a diameter of 65 mm.

**BUCCINUM BAYANI** Jousseume

*Tritonium bayani* JOUSS., Bull. Soc. Zool. de France, VIII, 1883, pl. x, fig. 5, "Japan."

This species is less common than the former, but was obtained from half a dozen stations in the Sea of Japan, and on the coast of

Korea, in from 42 to 406 fathoms. The maximum dimensions noticed are 125 by 50 mm.

### BUCCINUM LEUCOSTOMA Lischke

*Buccinum leucostoma* LISCHKE, Jap. Meeres Conchyl., III, p. 38, pl. 1, figs. 7, 8, 1875.

This handsome species is also rather frequently obtained, especially in Yeddo Bay and on the eastern shores of Nippon. Its dimensions when full-grown may attain 120 by 50 mm., and it has been dredged from as deep as 129 fathoms. The following form, notwithstanding the great difference in dimensions, except at the aperture, almost exactly reproduces this species.

### BUCCINUM ZELOTES Dall, n. sp.

Shell small, slender, acute, solid, with two smooth nuclear and eight turgid, strongly sculptured subsequent whorls; suture strongly constricted but not channeled; spiral sculpture of three strong ridges on the convexity of the whorl, articulated with white and reddish brown, a smaller one between the posterior ridge and the suture and another, anterior, on which the suture is laid; base with one more small ridge; in the interspaces are still smaller tertiary sharply cut threads, which also cover the base, and the whole is microscopically sharply striate; the axial<sup>1</sup> sculpture is composed of small but distinct

<sup>1</sup> A term for indicating the direction of the sculpture which crosses the whorls in general harmony with the axis of a spiral shell, in contrast with that which follows the coil, has long been needed. The latter is generally and appropriately termed "spiral." The former has been called "transverse," meaning transverse to the line of coil, but not transverse to the axis; and "longitudinal," a term which has also been used as synonymous with "spiral." Both of these terms are ambiguous. "Vertical" has sometimes been used, but when the sculpture in question is sinuous or oblique, it sounds disagreeably like a contradiction in terms. Some years ago I proposed to use the term "axial" for this sculpture, though in many cases it does not mathematically coincide with the axis of revolution; yet it seemed appropriate, brief, and comprehensible. If, however, anything less liable to miscomprehension, and in general more suitable, can be suggested, I shall be glad to adopt it. It should be remembered, in considering the subject, that the axis is not always vertical, and that vertical is an absolute term; vertical sculpture cannot logically be oblique, sinuous, or arcuate, while an axis may be either, as, for instance, in *Streptaxis* or some *Eulimas*.

For the direction of axial ribbing or other sculpture which is not strictly parallel to a vertical axis, concise terms are also needed to indicate whether the ribs slant forward from the summit of the whorls at the preceding suture, which might be called *protractive*, or backward, for which the term *retractive* might be used. Ribbing at right angles to the suture would naturally be called *paraxial* or vertical, as might be most appropriate to the special case.

threads, with wider interspaces which liriate the spiral ribs, but become feeble or absent on the base; aperture rounded, with a much thickened and reflected creamy white outer lip, more or less modified by the external sculpture; pillar and body with a coating of white enamel, the pillar twisted, the canal short, sharply recurved, making a strong fasciole; throat white. Lon. of shell, 62; last whorl, 30; maximum diameter, 30 mm.

Station 4826, in 114 fathoms, Sea of Japan, July 21, 1906. U. S. Nat. Mus., 110,513.

This shell has the same number of whorls with half the length of *leucostoma*, but a much heavier and differently formed outer lip.

#### BUCCINUM OPISOPLECTUM Dall, n. sp.

Shell small, elevated, slender, subacute, solid, flesh-colored, more or less variegated with brown and white, with one and a half smooth polished, nuclear and six sculptured subsequent whorls; suture distinct, not deep, the edge of the whorl in front of it gathered into rather irregular, small, short plications; spiral sculpture including two primary ridges near the periphery, with two more on the base, the minor sculpture as in *B. zelotes*, the stronger ridges articulated with brown and white; aperture semilunate, the outer lip callous, white, heavy, reflected; body and pillar with a thin white callus; pillar twisted, thickened at the edge; canal wide, recurved with a strong fasciole. Lon. of shell, 40; of last whorl, 27; of aperture, 20; maximum diameter, 21 mm.

Station 4996, in 86 fathoms, Sea of Japan. U. S. Nat. Mus., 110,514.

Belonging to the group of *leucostoma*, but much smaller and more conical.

#### BUCCINUM NIPONENSE Dall, n. sp.

Shell thin, elevated, flesh-color, more or less variegated or articulated with purple-brown and white, with an olive-brown, conspicuous periostracum and six moderately rounded whorls; suture distinct, not appressed, the whorl sloping flatly away from it to the shoulder; spiral sculpture on the upper whorls of three or four primary low, rounded ridges, the hindmost forming the shoulder of the whorl; on the last whorl nine or ten more, diminishing toward the canal; between these are smaller secondary threads separated by fine, sharp, narrow grooves which also striate the primary ridges and are crossed by fine sharp, sometimes elevated, incremental lines; aperture slightly patulous, outer lip concavely flexuous behind, somewhat thickened, hardly reflected, white; throat flesh-color or purplish

brown; body with a wash of callus; pillar straight; the young sometimes have a small sharp ridge upon it; canal wide, short, recurved, with a well-marked fasciole; operculum pale brown, with subcentral nucleus, small for the size of the shell. Lon. of shell, 57; of last whorl, 37; of aperture, 25; maximum diameter, 25 mm.

Station 5038, on the south coast of Nippon, in 175 fathoms, October 2, 1906; also at station 5049, in 182 fathoms. U. S. Nat. Mus., 110,515.

This is nearest some varieties of *B. polaris*, but more elevated, slender, smaller, and differently colored. The ovicapsule is lenticular, solitary, and about 10 mm. in diameter.

#### BUCCINUM CNISMATUM Dall, n. sp.

Shell small, thin, with about six whorls, rapidly increasing, whitish, with a very thin adherent brown periostracum; suture narrow, deep, almost channeled; spiral sculpture of three progressively diminishing strong, wide, ill-defined ridges, the first forming a shoulder near the periphery, the interspace between it and the next anterior roundly excavated, the second with the suture under it, the third and smallest in the middle of the base; between the suture and the shoulder the slope of the whorl is flattish; the whole surface sharply microscopical spirally striated, with the striae and intervals more or less fasciculated; aperture subtriangular, the outer lip modified by the sculpture, slightly expanded; throat and body glossy, pillar twisted; canal short, wide, recurved, forming a well-marked fasciole. Lon. of shell, 38; of last whorl, 27; of aperture, 20; maximum diameter, 20 mm.

Station 3331, in Bering Sea, north of Unalaska, in 350 fathoms. U. S. Nat. Mus., 110,518.

The sculpture of this curious shell is quite unique—the primary ridges being neither carinate nor squared, but passing without any demarcation into the slope of the interspaces.

#### BUCCINUM DIPLODETUM Dall, n. sp.

Shell small, thin, whitish, with a thin olivaceous more or less fibrous periostracum and about six rapidly increasing whorls; spiral sculpture of a narrow, flat-topped, strong keel at the shoulder, frequently another at or a little beyond the periphery, and sometimes two smaller threads, between the suture and the shoulder; secondary sculpture of rather obscure flattish spiral threads with equal or narrower interspaces (but no sharp striation) covering the whole surface; suture distinct, not channeled or appressed; aperture semi-

lunar, outer lip thin, slightly reflected; throat, body, and pillar glossy white; pillar short, straight; canal very short and wide, recurved, with an obscure fasciole; operculum well developed, pale, with the nucleus near the middle of the outer edge. Lon. of shell, 38; of last whorl, 26; of aperture, 17; maximum diameter, 21 mm.

Station 3074, off Sea Lion Rock, coast of Washington, in 877 fathoms. U. S. Nat. Mus., 110,517.

This is a very elegant and rather variable little species.

#### BUCCINUM EPISTOMIUM Dall, n. sp.

Shell of moderate size, solid, capacious, not constricted at the suture, with about six whorls, covered with a closely adherent smooth, unpolished, yellowish periostracum; apex defective; spiral sculpture of numerous, uniform, flattish spiral threads, with narrower, minutely channeled interspaces, about 3 to a millimeter; spire conic, the edge of the whorl more or less minutely puckered in front of the suture; aperture wide, rounded; throat purplish brown; outer lip very thick, white, somewhat reflected; body and pillar with little or no callus; pillar straight; canal wide, recurved, with a slight fasciole; operculum large, very thin, yellowish. Lon. of shell, 57; of last whorl, 40; of aperture, 28; maximum diameter, 35 mm.

Station 4804, off Cape Rollin, in 229 fathoms. U. S. Nat. Mus., 110,519.

An extremely well-marked and distinct species.

#### BUCCINUM SIGMATOPLEURA Dall, n. sp.

Shell subconic, narrowly turreted, smooth, with about six whorls; spiral sculpture none; axial sculpture of, on the last whorl, about thirty low, rounded, sigmoid ribs with subequal interspaces, extending from the shoulder to the canal; suture distinct, the whorl in front of it narrowly tabulate, but the outer margin of the tabulation evenly rounded off, outer layer of the shell chalky, eroded; toward the base and aperture the layer beneath is more or less colored with purple-black, which also colors the tops of some of the ribs; aperture white, the outer lip not flexuous, white, callous, hardly reflected; body and pillar with a marked callus; pillar arcuate; canal large, deep, recurved, almost as in *Nassa*, making a strong fasciole with a sharp keel at its hinder edge. Lon. of shell, 60; of last whorl, 41; of aperture, 29; maximum diameter, 30 mm.

Station 4792, off Bering Island, in 72 fathoms. U. S. Nat. Mus., 110,520.

In the regularity and extension of the ribs, the curious coloration of the under layer of the shell, and the keeled siphonal fasciole, this species is unique. All the specimens are decorticated hermit-crab shells, but the species cannot fail to be recognized if found.

**BUCCINUM POLIUM** Dall, n. sp.

Shell of moderate size, solid, elongate-ovate, subacute, with sharply constricted suture and about six rounded whorls; nucleus eroded; whorls in front of the suture slightly shouldered, strongly axially plicate; on the spire the plicæ form rounded arcuate ribs extending from suture to suture, with about equal interspaces; on the last whorl there are 20 to 22, which mostly become obsolete at or a little in front of the periphery; spiral sculpture of fine, feeble, flattish threads separated by narrow grooves, the threads becoming wider and a little more prominent on the base and canal; the whole is covered with a pale olivaceous gray periostracum, which along the incremental lines, when fresh, is delicately fringed, giving a pubescent aspect to the shell; aperture wholly bluish white, the outer lip slightly thickened and reflected; body with a polished white callus, which also extends along the inner side of the straight pillar; aperture longer than wide; canal short, deep, forming a well-marked fasciole. Lon. of shell, 42; of last whorl, 33; of aperture, 25; maximum diameter of shell, 22; of aperture, 11 mm. Operculum with a subcentral nucleus.

Stations 5011 and 5013, in Aniwa Bay, Sakhalin Island, in 42 and 43 fathoms, September, 1906. U. S. Nat. Mus., 110,523, 110,524.

This has some resemblance to *B. tenue* Gray, but has a different color and pubescent surface; the ribs are larger and less irregular than in *tenue* and the shell is more solid.

**BUCCINUM ŒDEMATUM** Dall, n. sp.

Shell rather thin, swollen, short-conic, with a greenish gray periostracum, which is smooth and caducous, whorls about seven, usually more or less eroded, with a chalky white substratum; sculpture of (on the penultimate whorl about forty) narrow, sharpish, sigmoid wrinkles, with wider interspaces, obsolete on the base, sparser on the last whorl, and more or less irregular, the whole surface finely, evenly, spirally striated; suture distinct, not deep; aperture milk-white, wide, ample, the outer lip deeply flexuous behind, slightly thickened, and reflected; body with a wash of glossy white callus; pillar very short, obliquely truncate, moderately callous; canal wide, very short, sharply recurved, with a well-marked fas-

ciolo. Lon. of shell, ♂, 60; of last whorl, 40; of aperture, 29; maximum diameter of shell, 35 mm.

Deep water in Bering Sea; type specimens from station 3502, near the Pribiloff Islands, in 368 fathoms, mud; bottom temperature, 37° F. U. S. Nat. Mus., 107,016. Operculum large, with sublateral nucleus.

A female specimen, still immature, measures 90 x 50 mm., and the species extends south, in deep water, as far as the coast of Oregon.

#### BUCCINUM ACUTISPIRATUM Dall, n. sp.

Shell very thin, slender, acute, with a sharply constricted suture and about eight evenly rounded whorls, covered with a very pale, nearly smooth olivaceous periostracum; surface with a few (on the antepenultimate whorl 18) nearly straight axial wrinkles, most evident on the upper part of the spire, though not always present; the spiral sculpture is of fine, flat, more or less wavy, threads having a tendency to pair, the intervals being feeble grooves, this sculpture, as usual, a little stronger toward the canal; aperture bluish white, outer lip thin, slightly expanded; body with a wash of callus; pillar rather long, arcuate, twisted, white, with a short, slightly recurved wide canal and feeble fasciole; operculum gray, with the nucleus subcentral. Lon. of shell, 55; of last whorl, 38; of aperture, 26; maximum diameter of shell, 26 mm.

Station 4982, in the Sea of Japan, in 390 fathoms, September 19, 1906. U. S. Nat. Mus., 110,525.

This belongs to the deep-water group of *Buccina*, which all have certain characters in common and can be distinguished at a glance from any shallow-water forms. The nucleus in the type specimen is unusually well preserved, and is subglobular and somewhat swollen, almost like that of some *Chrysodomus*.

#### BUCCINUM SURUGONUM Dall, n. sp.

Shell solid, heavy, acute, white, covered with a dehiscent, thin, polished periostracum, and with about seven rapidly increasing whorls; suture distinct, not appressed; whorl in front of the suture flattish, sloping to the shoulder and spirally sculptured with (on the last whorl about 12) sharp narrow, sometimes duplex revolving threads, with wider interspaces between the sutures; there is one strong spiral at the shoulder and another at the periphery, with three or four others less in size, and some still smaller intercalary threads and fine spiral striæ, the latter most prevalent on the last whorl; axial sculpture of sharp, elevated, regularly spaced incre-



mental lines which lirate the spiral sculpture; aperture milk-white; outer lip thickened, reflected, excavated behind; body with a glossy white callus which extends the whole length of the pillar, which is short, obliquely truncate in front; canal wide, shallow, recurved, with a moderate fasciole; operculum gray, with a laterally subcentral nucleus. Lon. of shell, 49; of last whorl, 35; of aperture, 26; maximum diameter of shell, 28 mm.

Station 5067, in Surugo Gulf, south coast of Nippon, Japan, in 29 fathoms. U. S. Nat. Mus., 110,526.

Apparently nearest to *B. polaris*, but destitute of axial ribbing and with a more acute spire.

#### BUCCINUM KADIAKENSE Dall, n. sp.

Shell small, acute, yellowish white, with about six sharply sculptured whorls; suture distinct, not appressed; axial sculpture of (on the last whorl of the type about 12) oblique, rounded, wave-like ribs, with wider interspaces, evanescent beyond the periphery; also of fine, prominent incremental lines; spiral sculpture of more or less alternated, distinct rounded threads, one at the periphery slightly more conspicuous than the others; the threads on the base, as usual, stronger than the others; aperture elongate, narrow, body and pillar callous, white, a slight, oblique ridge on the pillar near its anterior edge; pillar long, straight, white; canal wide, hardly recurved. Lon. of shell, 21; of last whorl, 13.5; of aperture, 9; maximum diameter, 8.5 mm.

Kadiak Island, between tide marks, Alaska. U. S. Nat. Mus., 110,527.

This little species recalls *Buccinum ciliatum* Fabricius in its sculpture, but is much more slender and has a more acute and proportionately longer spire. The aperture is not quite completed, but the nucleus of the operculum is subcentral.

#### BUCCINUM ANIWANUM Dall, n. sp.

Shell of moderate size, with about six evenly rounded, rapidly increasing whorls; suture distinct, not appressed; spiral sculpture practically the same over the whole surface, consisting of fine, subequal, flattish threads, usually paired and arranged in fasciculi of three pairs; these are crossed with extremely minute, elevated, incremental lines which microscopically reticulate the sculpture, showing strongest in the narrow grooved interspaces; aperture semilunar, outer lip (defective); body with a thin wash of glossy callus; pillar thin, white, its edge in front gyrate and almost pervious; throat white,

with a lemon-yellow suffusion; canal wide, deep, producing a weak fasciole; operculum thin, pale, the nucleus nearly central. Lon. of shell, 48; of last whorl, 33; of aperture, 24; maximum diameter, 25 mm.

In Aniwa Bay, at the south end of Sakhalin Island, at station 5012, in 40 fathoms. U. S. Nat. Mus., 110,528.

Remarkable for its minute, fine, sharp, uniform sculpture.

#### BUCCINUM SAKHALINENSE Dall, n. sp.

Shell small, solid, acute, grayish olive, with about seven rapidly increasing whorls; axial sculpture of (on the penultimate whorl about 15) obliquely arcuate, strong rounded ribs, beginning at the suture and becoming obsolete at or near the periphery, on the last whorl weaker and more irregular; spiral sculpture of numerous close, ill-defined, revolving ridges, of which on the last whorl about six are more conspicuous than the others, but all are sharply minutely spirally grooved, the larger ridges having from three to five grooves each; the whole is crossed by minute, crowded, slightly elevated, distinct incremental lines; aperture white, outer lip slightly expanded; body and pillar with a moderate callus; pillar short, its anterior edge distinctly twisted; canal wide, deep, recurved, forming a strong fasciole, with a low sharp keel at its posterior edge; operculum with the nucleus nearly central. Lon. of shell, 36; of last whorl, 26; of aperture, 20; maximum diameter, 21 mm.

Station 5010, Aniwa Bay, Sakhalin Island, in 21 fathoms. U. S. Nat. Mus., 110,529.

This has somewhat the aspect in miniature of *B. undatum*; it is probable that when the shell is fully mature the outer lip is considerably thickened.

#### BUCCINUM ECTOMOCYMA Dall, n. sp.

Shell large, thin, acute, olivaceous, with a claret-colored nucleus and about six whorls; suture distinct, almost appressed; in front of it the whorl is, as it were, pinched up into short, irregular, strong waves (about 12 on the last whorl), too irregular in form and direction to be called ribs, usually not reaching the periphery; there are also elevated minute incremental lines at intervals on which the otherwise closely adherent periostracum is slightly produced; spiral sculpture of two or three major spiral ridges, one (sometimes obsolete) at the shoulder, another bordering the base, and a feebler one or two on the base; beside this the whole surface is finely sharply grooved and the corresponding raised interspaces are fasciculated in

groups of five or six, separated by somewhat deeper grooves; aperture large, whitish; outer lip defective, body and pillar with a wash of callus; pillar short, straight; canal wide, deep, recurved, forming a strong rounded fasciole. Lon. of shell, 52; of last whorl, 40; of aperture, 28; maximum diameter, 30 mm.

Station 5023, on the east coast of Sakhalin, in 75 fathoms. U. S. Nat. Mus., 110,530.

Perhaps nearest to *B. verkruseni* Kobelt, but a shorter, wider shell, without the regularly spaced similar ribs and elevated spire of that species.

#### BUCCINUM BOMBYCINUM Dall, n. sp.

Shell small, bulimoid, polished, livid flesh-color, extremely thin, with a subacute spire, thin, closely adherent periostracum and about six whorls; surface smooth, except for very faint incremental lines and a few, simple, spiral, nearly obsolete lines, which look as if they had been pushed out from the inner side of the whorl with a sharp stylus; shell not constricted at the suture; aperture semilunar, outer lip thin, expanded; throat pinkish, a thin wash of callus on the body; pillar white, thin, obliquely truncate in front, the axis pervious in the adult; canal shallow, wide, slightly recurved, forming a slight fasciole; operculum subcircular, nucleus subcentral. Lon. of shell, 27; of last whorl, 20; of aperture, 15; maximum diameter, 14 mm.

Station 5067, in 29 fathoms, on the east coast of Sakhalin Island, Okhotsk Sea. U. S. Nat. Mus., 110,531.

Allied to *B. hydrophanum* Hancock and others of that group, but smaller and differing in minor details.

#### BUCCINUM LIMNOIDEUM Dall, n. sp.

Shell thin, elevated, acute, slender, straw-color, with spiral bands of pale purple-brown, most of those on the last whorl narrow and articulated, but probably variable, as in other species, with about eight evenly rounded whorls; nucleus of two whorls, the first blunt and smooth, the second sharply spirally striated; subsequent whorls slightly irregularly puckered in front of the suture, but less so on the last whorl; remaining sculpture microscopic spiral striæ, more or less wavy and reticulated by sharp but microscopic incremental lines; the striation is fasciculated by recurrent deeper grooves, but to the unaided eye the shell appears almost smooth; outer lip thin, sharp; throat whitish, a wash of callus on the body and pillar; columella white, strongly twisted, almost plicate, not pervious; canal short, well defined, recurved, forming a strong fasciole, with a sharp

keel at its hinder edge. Lon. of shell, 40; of last whorl, 26; of aperture, 18; maximum diameter, 17 mm.

Station 4808, off Hakodate, Japan, in 47 fathoms. U. S. Nat. Mus., 110,532.

The shell has somewhat the form of a large *Lymnaea* and is hardly more substantial. It belongs to the group of *B. picturatum* Dall.

#### BUCCINUM SIMULATUM Dall, n. sp.

Shell resembling the last in minor sculpture, but with six or seven obscure ribs on the penultimate whorl, hardly reaching the periphery, three strong spirals on the whorls, the last just above the suture and the fasciculi of the spire elevated until they resemble striated threads; color pale livid brown, without color-bands; whorls eight; outer lip thin, slightly expanded, and in front thickened with a white border; throat brownish; body and pillar glossy, not callous; canal short, wide, recurved, with a strong fasciole with a groove behind it, but no keel. Lon. of shell, 38; of last whorl, 25; of aperture, 17; maximum diameter, 17 mm.

Station 4779, in 54 fathoms, on the Petrel Bank, Bering Sea, June 9, 1906. U. S. Nat. Mus., 110,533.

#### BUCCINUM BULIMULOIDEUM Dall, n. sp.

Shell small, very thin, with a thin periostracum of a straw-yellow color, distinct suture, subacute spire, and about six whorls; surface apparently smooth, but under the lens showing fine uniform microscopic spiral striation, not fasciculated, but more or less undulate; aperture white, outer lip slightly expanded and thickened; a thin wash of callus on the body; pillar short, twisted, not pervious; canal short, wide, deep, forming a marked fasciole with no keel behind it; when fresh, the periostracum, rising on the incremental lines in microscopic elevated lines, reticulates the sculpture, but this is lost with wear. Lon. of shell about 34; of last whorl, 25; of aperture, 16.5 mm.; maximum diameter, 15 mm.

Station 2853, in 159 fathoms, sand, southeast of Alaska Peninsula. U. S. Nat. Mus., 110,534.

This has very much the aspect of a *Bulimulus*, with the exception of the canal.

#### BUCCINUM ROSSICUM Dall, n. sp.

Shell large, solid, short-conic, with about six whorls, white, clothed with a dense, thick, reticulated pubescent periostracum of an olivaceous tint; whorls rapidly increasing, with an elevated, small, spiral ridge forming a wide, shallow channel in front of the suture,

which is usually more or less eroded; at the shoulder is a similar spiral and sometimes one or two fainter ones in front of it; the remaining sculpture is entirely fine spiral threads with narrower interspaces, crossed by incremental lines, while on both lines and threads the lamellæ of the periostracum project from the surface in a dense velvety coating; aperture milk-white, the body and pillar heavily callosified; outer lip thick, expanded, excavated behind; pillar twisted; canal wide, deep, recurved, forming a very prominent fasciole; operculum large, concave, subcircular, the nucleus subcentral. Lon. of shell, 70; of last whorl, 50; of aperture, 35; maximum diameter, 36 mm.

Station 5011, in Aniwa Bay, southern Sakhalin, in 42 fathoms; U. S. Nat. Mus., 110,535; also in Tsugaru Strait, north Japan, in 300 fathoms. U. S. Nat. Mus., 110,536.

This coarse and heavy shell has the general form of *B. viridum* Dall, of the deep water of the California coast, but has finer minor sculpture, a much coarser periostracum, and is in every way a rougher and more solid species, attaining a larger size. At first sight it suggests an *Ancistrolepis*, but the animal and operculum are truly buccinoid.

#### BUCCINUM PEMPHIGUS Dall, n. sp.

Shell large, thin, swollen, pale olivaceous, with a smooth periostracum over a white chalky layer underlaid by a flesh-colored substratum, with about seven whorls; suture appressed, the surface of the whorl sloping rapidly away in front of it to a small sharp carina which marks the shoulder of the whorl, beyond which the whorl is globosely rounded; there is no axial sculpture except incremental lines; the spiral sculpture consists of low, flattish threads, more or less alternated in size, a few between the shoulder and periphery somewhat more prominent than the rest, but not elevated, having wide striated interspaces, while those in front of the periphery are smaller, closer, and pretty regularly alternated in three sizes; aperture wide, white, the body pinkish, the anterior end of the pillar suffused with yellow; outer lip thin, slightly expanded and flexuous; body with glaze over the pink substratum; pillar straight, its edge gyrate, completely pervious; canal short, wide, recurved, with a faint fasciole; operculum thin, yellowish, with the nucleus sublateral in the posterior third. Lon. of shell, ♂, 63; of last whorl, 48; of aperture, 37; maximum diameter, 37 mm. The females are somewhat stouter and shorter.

Station 4797, in 682 fathoms, off Dalnoi Point, Kamchatka, June 20, 1906. U. S. Nat. Mus., 110,537.

This fine species belongs to the same general group in the genus as the last, but is strongly contrasted with it in many details.

**BUCCINUM OROTUNDUM** Dall, n. sp.

Shell acute, short, very wide, of a creamy or pinkish white, covered with a thin dehiscent periostracum, having about six whorls; suture distinct, appressed, with a few small irregular axial plications in front of it, especially on the apical whorls; spiral sculpture of low, fine, sharp, subequal threads, of which a few, especially near the canal, are more prominent, having three or four less prominent ones between them; the interspaces are, as a rule, wider, and are reticulated by incremental lines; aperture wide, patulous, yellowish within; outer lip thin, sharp, expanded, flexuous behind, slightly thickened within; body white, glossy; pillar white, arcuate, with a thin layer of callus; canal wide, deep, recurved, forming a conspicuous fasciole with a wide channel behind it; operculum large, brown, with a subcentral nucleus. Lon. of shell, ♂, 60; of last whorl, 50; of aperture, 39; maximum diameter, 40 mm.

Station 3254, in 46 fathoms, north of Unimak Island, Bering Sea; bottom temperature, 36°.2 F. U. S. Nat. Mus., 110,538.

This belongs to the group of *B. polarc*, but is far more expanded and devoid of the strong keels which characterize typical *polarc*.

**BUCCINUM FUCANUM** Dall, n. sp.

Shell small, solid, short-conic; spire acute, with a constricted suture and about seven whorls; color pale brownish over a white chalky substratum; suture not appressed or channeled, with (on the last whorl 21) faint, narrow, low, flexuous plications in front of it, which become obsolete on the periphery; the incremental lines, though almost microscopic, are sharp, close, regular, and elevated, forming a distinct feature of the sculpture; spiral sculpture of small, flat fasciculi of four or five threads each, the fasciculi separated by deeper grooves about half the width of a fasciculus; this sculpture requires a lens to make it out and is quite uniform over the surface; aperture wide, white; outer lip expanded, reflected, and thickened, somewhat excavated behind; body with a thin white callus; pillar short, twisted, not pervious; canal wide, short, recurved, forming a moderately distinct fasciole; operculum thin, the nucleus midlateral or nearly so. Lon. of shell, 45; of last whorl, 34; of aperture, 23; maximum diameter, 27 mm.

Station 3452, in 125 fathoms, Fuca Strait; bottom temperature, 44°.5 Fahrenheit. U. S. Nat. Mus., 130,426.

A pretty little species of the *B. plectrum* group.

**BUCCINUM EUGRAMMATUM** Dall, n. sp.

Shell acute conic, thin, of a subtranslucent brownish consistency (like *B. castaneum* Dall), with about seven turreted whorls; nucleus smooth, of two whorls; suture distinct, with a wide channel in front of it, due to the first spiral rib; axial sculpture of faint incremental lines; surface with an extremely thin, smooth, deliscent periostracum; spiral sculpture between the sutures of five or six strong, squarish, prominent, spiral ribs, with slightly narrower channeled interspaces, of which there may be from seven to ten on the last whorl; the posterior rib in many cases is nodulous or beaded, corresponding to little waves which at intervals may cross the sutural channel but do not seem ever to extend beyond the second rib; aperture semilunar, throat and body yellow, pillar and outer lip white; outer lip thickened, expanded, somewhat reflected, undulated by the ends of the ribs; a glaze of callus on the body; pillar straight, not pervious; canal wide, deep, recurved, forming a strong fasciole; operculum small, rounded-triangular, the nucleus near the narrower end. Lon. of type specimen, ♀, 54; of last whorl, 40; of aperture, 28; maximum diameter, 31 mm. A defective specimen measures 69 mm. long and 40 mm. in diameter.

Station 4777, in 52 fathoms, Petrel Bank, Bering Sea. U. S. Nat. Mus., 110,539. Specimens were found occupied by hermit-crabs in 54 fathoms at station 4779, in the same vicinity.

This is the most remarkable species made known for a long time and belongs to the group of *B. castaneum* Dall. The strong, clean-cut, regular spiral ribs, with their deep interspaces, give a very striking aspect to the shell.

In leaving the group it may be mentioned that a magnificent specimen of *B. hertzensteini* Verkrusen, was dredged near the entrance to Avacha Bay, Kamchatka, in 58 fathoms, and a variety of *B. verkruseni* Kobelt, was obtained in 21 fathoms, in Aniwa Bay, Sakhalin.

Genus **CHRYSODOMUS** Swainson**CHRYSODOMUS INSULARIS** Dall, var. **CONTRACTUS** nov.

Shell large, thin, pinkish white or purplish brown, with a suffusion of orange on the pillar and part of the outer lip; whorls seven or more, constricted at the suture, outer lip semicircular, thin; axis pervious; spiral sculpture as in typical *insularis*, but with the major spirals decidedly stronger. Lon. of shell, 173; maximum diameter, 107 mm.

Station 4863, in 260 fathoms, off Korea, July 31, 1906; U. S. Nat. Mus., 110,481; also at stations 4868, in 150 fathoms, off Korea, and 5049, in 182 fathoms, east coast of Nippon.

This form differs from *insularis* proper by its rounded whorls, which do not slope away from in front of the suture, which is emphasized as if constricted, and by its more emphatic spiral sculpture and larger size.

**CHRYSODOMUS VARICIFERUS** Dall, n. sp.

Shell large, very thin in proportion to its height, with six or more rounded whorls; spire short, conic, apex submammillate, whorls rapidly increasing; sculpture of (on the last whorl about seven) sharp, thin, very prominent varices, but little reflected, though projecting 10 to 12 mm. from the whorl; spiral sculpture, on the apical whorls, of three or four obsolete ridges subequal and distant, the middle one on the periphery, and faint spiral threads over and between them; on the later whorls this is obsolete, and the last whorl often shows no spiral sculpture or only faint indications of any; aperture wide, narrow behind and in front, a thin callus on the body and pillar, the outer lip expanded, sharp; pillar narrow, twisted, with a very prominent siphonal fasciole; canal short, slightly recurved. Lon. of shell, 186; of last whorl, 146; of aperture, 117; maximum diameter, including varices, 118; of aperture, 61 mm.

Station 5021, on the east coast of Sakhalin Island, and various stations in the eastern part of Bering Sea. Type, U. S. Nat. Mus., 110,482.

Most likely to be confounded with the smaller and heavier *C. fornicatus* Gray.

**CHRYSODOMUS (PERICOCHLION** Schrenck, var?) **PARALLELUS** Dall, nov.

PILSBRY, Acad. Nat. Sci. Phila., Proc. 1901, p. 391, pl. xx, fig. 23.

This form is more elongate, with the same number of whorls, the channel at the suture is wider, the whorls more tabulate and parallel-sided than the typical *pericochlion* of Schrenck. These differences were observed by Pilsbry, but might have been ascribed to individual variation when known only from two specimens; but, a number of specimens having been obtained from Hirasé and the *Albatross* dredgings, all agree with each other and with Pilsbry's figure in these differences; so that the presumption is strong that a different race or variety is indicated, or possibly a different species. A large specimen exhibits 7 whorls, having lost about two; it measures 138 mm. in length by 48 mm. in greatest width; the maximum length of



aperture is 59, its breadth 28 mm. The same dimensions of Schrenck's form are given by him as, respectively, 104, 47, 46, and 28 mm. with 8 to 9 whorls. Type, U. S. Nat. Mus., 170,798, from the east coast of Nippon.

**CHRYSODOMUS ADELPHICUS** Dall, n. sp.

Shell small, compact, with about eight whorls, with a deep channel 1.5 mm. in width in front of the suture, bordered anteriorly by a rounded ridge; first three or four whorls subequal, the remainder rapidly increasing in width; sculpture of fine spiral striæ, the interspaces hardly raised, the striæ segregated into fasciculi by recurring slightly wider sulci; base with the striæ obsolete and the fasciculi represented by slightly more prominent but feeble spiral ridges; pillar callous, arcuate, twisted, almost pervious; canal elongate, narrow, recurved; outer lip thin, gently concave in the middle; shell brownish cream-color, the aperture white. Lon. of shell, 58; max. lat., 24; lon. of last whorl, 38; of aperture, 30 mm.

U. S. Nat. Mus., 109,247. Yokohama. W. J. Fisher.

This shell was kept for many years in the supposition that it was *C. pericochlion*, but on comparison is easily separable.

**CHRYSODOMUS ONCODES** Dall, n. sp.

Shell solid, compact, turgid, pale brown, of about six whorls; apex defective; whorls rounded, with suture inconspicuous, in front of it sloping gently, with two or three prominent spiral cords separated by wider spirally threaded interspaces; the middle of the whorls with three prominent spiral ridges, the base with ten or twelve less prominent spirals, all with wider, evenly threaded interspaces; the spiral sculpture crossed only by lines or irregularities of growth; the absence of any marked shoulder to the whorls is conspicuous; aperture semilunar; outer lip moderately thickened, not reflected; pillar and body with a moderate layer of callus; the depth of the throat, the outer lip at the margin, and the pillar tinged with purplish brown, the rest white; pillar slightly tortuous, not pervious; canal very short, wide, slightly recurved, with a moderate fasciole. Lon. of shell (decollate, leaving four whorls), 104; of last whorl, 80; of aperture, 62; maximum diameter of shell, 60; of aperture, 32 mm. The total length was originally about 110 mm.

Station 4804, in 229 fathoms, Okhotsk Sea, June 24, 1906. U. S. Nat. Mus., III,483.

Remarkable among the species of the *livatus* group, to which it belongs, by the absence of any shoulder to the whorl and the inconspicuous suture.

**CHRYSODOMUS EULIMATUS** Dall, n. sp.

Shell solid, purple-brown, fusiform, with two rather large, smooth nuclear and five subsequent whorls; suture appressed, distinct, the whorl in front of it somewhat constricted, axial sculpture of eight strong, prominent, rounded ribs conspicuous at the shoulder and on the periphery, but obsolete on the base, somewhat flexuous, the whole surface roughened by low, sharp, slightly elevated incremental lines; spiral sculpture practically uniform over the surface and consisting of major spiral cords less than a millimeter in diameter, rounded, with subequal interspaces and minor intercalary threads, usually one, but on the base often two to each interspace, the whole having a rasplike feeling due to the incremental lines; aperture long and narrow, livid brownish; outer lip sharp, body and pillar with a glaze of callus; pillar long, strongly twisted, not pervious; canal long, rather wide, slightly recurved, with a moderate fasciole; periostracum brownish, much as in *C. liratus* Martyn; operculum rather small, with apical nucleus. Lon. of shell, ♂, 68; of last whorl, 53; of aperture and canal, 43; maximum diameter of shell, 34 mm.

Station 5010, Aniwa Bay, Sakhalin Island, in 21 fathoms. U. S. Nat. Mus., 110,541.

This species has somewhat the general form of *Kellettia kelletti*, but with a proportionately longer canal. The rasplike surface is unique, so far, among the species from the North Pacific region. The specimen is probably immature and may attain a considerably larger size.

**CHRYSODOMUS TROCHOIDEUS** Dall, n. sp.

Shell small, white, broad, remarkably depressed, with about five whorls; nucleus eroded; subsequent whorls rapidly increasing, suture almost channeled, spiral sculpture of, in front of the suture, three or four small, squarish, revolving ribs, with wider excavated interspaces, then a strong peripheral keel, then six or seven, gradually diminishing on the base and canal, always narrower than the interspaces, with an occasional intercalary thread; spire and base short-conic; aperture wide, outer lip sharp, interior white, smooth; body with a wash of callus; pillar short, strongly twisted, and flaring anteriorly; canal very short, wide, and recurved, with no siphonal fasciole. Lon. of shell, 20; of last whorl, 15; of aperture, 11.5; max. lat. of shell, 14.5; of aperture, 7 mm.

Stations 4972, in 440 fathoms, and 4973, in 600 fathoms, off Yokohama, Japan. U. S. Nat. Mus., 110,494 and 110,495.

A curious, squatty little species, unlike any other.

## Subgenus ANCISTROLEPIS Dall

**CHRYSODOMUS (ANCISTROLEPIS) UNICUS (Pilsbry)**

*Buccinum unicum* PILSBRY, Proc. Acad. Nat. Sci. Phila., 1905, p. 102.

This species, originally referred to *Buccinum*, is a member of this group of very buccinoid form, but *B. taphrium* Dall, the type of the subgenus *Sulcosinus*, has a light, delicate, small shell with a heavy, reflected, callous margin to the outer lip, and a more buccinoid canal than any of the species yet shown to belong to *Ancistrolepis*; so, until the operculum and its anatomy are known, it seems imprudent to merge *Sulcosinus* with *Ancistrolepis*, though the almost channeled suture is very similar.

**CHRYSODOMUS (ANCISTROLEPIS) DAMON Dall, n. sp.**

Shell elongate, solid, six-whorled, with almost exactly the same sculpture as *C. unicus*, but much more attenuated and larger; the periostracum is dark brown, originally finely axially lamellose, but when worn appearing smooth or even polished; canal and pillar shorter than the aperture, the canal wide, much recurved; pillar twisted but not pervious, callous, bluish white like the rest of the inside of the aperture. Lon. of shell, 80; of last whorl, 55; of aperture 37; max. lat. of shell, 40; of aperture, 20 mm.

Station 5038, in 175 fathoms, October 2, 1906, on the south coast of Yesso. U. S. Nat. Mus., 110,474.

This shell has an extraordinarily close resemblance in sculpture to *C. unicus*, while differing essentially in form, being related to the latter much as *C. grammatus* is to *C. eucosmius*. The effect of wear upon the appearance of the periostracum is very deceptive; shells which appear when worn to have a polished surface frequently were originally more or less villous.

A specimen of *C. (Ancistrolepis) magnus* Dall 128 mm. long was dredged at station 5021 in 73 fathoms, east coast of Sakhalin Island, Sea of Okhotsk.

**CHRYSODOMUS (ANCISTROLEPIS) HIRASEI (Pilsbry)**

*Buccinum hirasei* PILSBRY, Proc. Acad. Nat. Sci. Phila., 1901, p. 391, pl. XX, fig. 22.

This fine species, originally described from a dead shell under the name *Buccinum hirasei*, is certainly a member of the subgenus of *Chrysodomus*, described by me in 1895 under the name of *Ancistrolepis*. The only difference noted is that the periostracum is smooth instead of villous when worn. This group is now found to be rather

numerous in species in the northwestern Pacific, Bering, and Okhotsk seas.

**CHRYSODOMUS (ANCISTROLEPIS) GRAMMATUS** Dall, n. sp.

Shell large but thin, with about nine subtabulate whorls, sculptured with eight or nine very prominent T-rail-shaped spiral ribs, separated by somewhat wider, deeply channeled interspaces; about five of these spirals show between the sutures on the spire; surface covered with a rather thick, axially striated brown periostracum, underneath which is a thin chalky layer of shell easily eroded; pillar and canal, as in all the group, shorter than the aperture, the pillar twisted and more or less pervious, but little recurved; pillar and body with a conspicuous white callus; aperture wide, squarish, the outer lip crenulate by the sculpture, protracted in front beyond the end of the pillar; throat white, not lirate, but reflecting the external ribbing: Lon. of ♀ shell, 101; of last whorl, 65; of aperture, 40; max. lat. of shell, 53; of aperture, 30 mm.

Station 5032, in 300 fathoms, Tsugaru Strait, September 30, 1906. U. S. Nat. Mus., 110,472.

This recalls *C. (A.) cucosmius* Dall from Bering Sea, but is much larger, with more prominent sculpture and a less twisted pillar. The operculum is heavy, large, and black, of the typical form, though in the young it is lighter-colored and slightly arcuate. The sculpture recalls that of *Beringius crebricostatus* Dall.

Genus TRITONOFUSUS Beck

**TRITONOFUSUS CALAMÆUS** Dall, n. sp.

Shell thin, white, covered with a straw-yellow periostracum and having about six well-rounded whorls; suture very distinct; apex eroded, nucleus apparently small; sculpture entirely spiral, of (between the sutures on the penultimate whorl, 12) flattish, low, equal, slightly rounded, spiral ridges, separated by narrower, subequal, channeled interspaces and crossed only by faint incremental lines; aperture milk-white, the body with an eroded polished area, the pillar thick and white, twisted and recurved anteriorly; canal wide, short, with no siphonal fasciole; outer lip thin, slightly reflected. Lon. of shell (tip eroded), 57; of last whorl, 42; of aperture, 32; maximum diameter of shell, 28; of aperture, 14 mm.

Station 4797, in 682 fathoms, Okhotsk Sea, June 20, 1906. U. S. Nat. Mus., 110,478.

Notable for its regular sculpture, cheerful yellow color, and milky-white aperture. The operculum is large and brown in color.

**TRITONOFUSUS ESYCHUS** Dall, n. sp.

Shell slender, acute, solid, of a pinkish brown color, and about eight moderately convex whorls; apex more or less eroded, acute, the suture not deeply constricted; sculpture of numerous fine, narrow, flattish spiral ridges, with a tendency to pair, separated by narrower, not channeled interspaces; the sculpture is distinct but not strong; there are about 25 spirals on the penultimate whorl, of which perhaps one-third are rendered duplex by a medial groove; aperture ovate, livid pink, the outer lip slightly reflected; pillar slender, strongly twisted, and almost pervious; canal contracted and recurved. Lon. of shell, 52; of last whorl, 33; of aperture, 24; maximum diameter of shell, 21; of aperture, 10 mm.

Stations 4791 and 4792, off Bering Island, June 14, 1906, in 76 and 72 fathoms. U. S. Nat. Mus., 110,479.

A larger but imperfect specimen measures 60 mm.

This form recalls *T. spitsbergensis* Reeve, but has a finer and less elevated sculpture and different color.

Subgenus **PLICIFUSUS** Dall**TRITONOFUSUS (PLICIFUSUS) POLYPLEURATUS** Dall, n. sp.

Shell small, thin, with a smooth polished nucleus and seven or more subsequent strongly ribbed whorls; color pale purplish brown, lighter on the ribs; the latter are numerous (18 on the seventh whorl), narrow, irregularly oblique, with subequal interspaces; spiral sculpture faint, visible only on the earlier part of the spire; whorls evenly rounded, suture distinct; aperture semilunar, pillar white, callous; outer lip simple, slightly expanded; canal defective. Lon. of shell, 29 +; maximum diameter, 12.5 mm.

Station 4996, in 86 fathoms, Sea of Japan. U. S. Nat. Mus., 110,476.

A small, slender shell, with close, prominent, rather irregular, oblique riblets, not stopping abruptly at the edge of the base, as in *T. kroyeri*, which with the same number of whorls would be twice as long.

**TRITONOFUSUS (PLICIFUSUS) ELÆODES** Dall, n. sp.

Shell slender, acute, with a distinct suture, eight moderately rounded whorls, covered with an axially striated nearly smooth, pale olive-gray periostracum over a white or purplish substratum; apex eroded; subsequent whorls sculptured almost exactly like *Buccinum tenue*, with about (on the penultimate whorl) 16 axial, irregular,

low, rounded ribs, with mostly wider interspaces extending irregularly beyond the periphery more or less on to the base; the posterior part of the whorls show a few faint, nearly obsolete, small spiral ridges, but the base is sharply spirally sulcate; aperture semilunar; body and pillar smooth, the pillar twisted, almost pervious; the canal short, wide, strongly recurved; outer lip thin, sharp, possibly a little reflected in the adult. Lon. of shell, 54; of last whorl, 34; of aperture, 25; maximum diameter of shell, 22; of aperture, 11 mm.

Station 5011, in 42 fathoms, September 25, 1906, Aniwa Bay, Sakhalin Island. U. S. Nat. Mus., 110,477.

Recalling the young of *T. kroyeri*, but showing on careful inspection a different color and sculpture.

#### TRITONOFUSUS (PLICIFUSUS) RHYSSUS Dall, n. sp.

Shell of moderate size, white below a pale olivaceous periostracum; of five or six moderately rounded whorls, the apex defective, the suture very distinct, but not channeled; axial sculpture of faint, somewhat irregular, low, short wrinkles, beginning in front of the suture, more sparse and feeble on the last whorl and disappearing at or near the periphery of the whorls; spiral sculpture of fine, close, sharp, equal striae, with the wider interspaces rounded, about three to a millimeter, covering the whole surface; aperture semilunar, internally white, a thin callus on the body and pillar; outer lip thin, slightly expanded; pillar straight, its anterior edge a little gyrate; canal short, wide, a little recurved, fasciole inconspicuous. Lon. of shell, 49; of last whorl, 35; of aperture, 25; maximum diameter of shell, 20; of aperture, 10 mm.

Station 5013, in 43 fathoms, September 2, 1906; U. S. Nat. Mus., 110,489; also at station 5011, in 42 fathoms, both stations in Aniwa Bay, Sakhalin Island.

The wrinkling, though not as profuse, and the color of the shell recall those of *Buccinum tenue*.

#### TRITONOFUSUS (PLICIFUSUS) AURANTIUS Dall, n. sp.

Shell of orange-yellow or salmon-colored understratum, covered with a thin chalky layer under an olive-gray periostracum, usually much eroded, with five or six whorls and a very distinct but not channeled suture; surface with numerous fine flattish close-set threads, with narrower channeled interspaces, about four to a millimeter, covering the whole surface, but a little fainter in front of the suture; aperture ovate, the outer lip thin, concavely flexuous behind, produced in front, the body and throat pale-orange color, the body

and pillar with a thin layer of callus; canal short, strongly twisted and recurved, with a moderate fasciole; axis pervious. Lon. of shell, 46; of last whorl, 32; of aperture, 24; max. lat., 22 mm.

Station 4982, in 390 fathoms, Sea of Japan, September 19, 1906. U. S. Nat. Mus., 110,490; also at stations 4828 and 4855, in 163 and 70 fathoms, respectively, near the coast of Korea.

The orange-color, conspicuous by the usual erosion of most of the surface, and the short, strongly recurved canal are characteristic features. What appears to be a variety or closely allied species has a deeply orange-tinted shell, with four whorls, strongly recurved, short canal, but with the spirals about twice as wide as in the type, flat above and with distinctly channeled interspaces in which the incremental lines are strong. Lon. of shell, 20; max. lat., 11 mm.; the last whorl 15 and aperture 11 mm. long.

Station 3279, in 41 fathoms, sand, Bristol Bay, Alaska. U. S. Nat. Mus., 122,664.

This form might take the varietal name of *laticordatus*. It is not uncommon in Bering Sea.

#### TRITONOFUSUS (PLICIFUSUS) CROCEUS Dall, n. sp.

Shell slender, acute, reddish yellow under a pale olive periostracum, with two swollen nuclear and six subsequent whorls; axial sculpture strongest on the spire, where the penultimate whorl shows about 20 rounded, narrow plications with wider interspaces, fading out beyond the periphery and on the last whorl obsolete or absent; spiral sculpture of fine, rounded, closeset, similar spiral threads, subequal over the whole surface except a narrow margin in front of the suture, where they are more or less obsolete; aperture semilunate, internally brownish, with a salmon-tinted pillar obliquely truncate in front, with a moderately recurved canal, the axis not pervious. Lon. of shell, 39; of last whorl, 25; of aperture, 19; maximum diameter of shell, 15; of aperture, 7 mm.

Station 4982, in 390 fathoms, Sea of Japan, September 19, 1906. U. S. Nat. Mus., 110,491; also at station 5038, in 175 fathoms, south coast of Yesso.

This is a more slender species, with a thinner shell and straighter canal than the preceding, which have no axial riblets. It recalls *T. latericeus* Sars, in a general way, but is a much larger shell.

#### TRITONOFUSUS (PLICIFUSUS) KROYERI Möller, 1842

Collected with the preceding. This species is characterized by fine continuous spiral striation, extending over the whole shell except

where it is replaced on the base and canal by the usual coarser striation. The variety *cretacea* Reeve (as *Buccinum*), is distinguished by the absence of the fine striation on the greater part of the shell, more regular and stronger ribs, and more expanded aperture. It was dredged at stations 4779, 4994, 4795, and 5005, in 47 to 190 fathoms. The young are sometimes purplish brown, with the axial ribs ivory-white, stopping short at the edge of the base, which is sharply spirally grooved, making a very striking-looking shell. The adults usually have the spire much eroded, with about 13 ribs on the penultimate and 15 to 18 on the last whorl, obliquely arcuate, with the concavity on the anterior side.

### Genus MOHNIA Friele

#### MOHNIA MICRA Dall, n. sp.

Shell quite small, acute, slender, greenish olive over a chalky substratum, more or less eroded; whorls five or more, the nucleus eroded, the suture minutely channeled; whorls smooth except for incremental lines, moderately rounded; aperture white, outer lip thin, slightly arcuate; body with a wash of callus; pillar white, twisted, almost pervious; canal moderately produced, twisted, almost pervious; on the back of the canal and base there are a few faint spiral striæ. Lon. of shell, 15; of last whorl, 10.5; of aperture, 7; max. lat. of shell, 7 mm.

Station 4813, in 200 fathoms, off Sado Island, Japan Sea, July 18, 1906. U. S. Nat. Mus., 110,499.

This is the smallest species yet described.

#### MOHNIA SORDIDA Dall, n. sp.

Shell small, slender, acute, with a strong blackish or brownish periostracum, paler or even greenish white on the base and pillar, with a narrowly channeled suture and about six whorls; nucleus eroded, shell more or less coated with a rusty, earthly deposit; early whorls with a few obsolete spirals, the most prominent one peripheral, but absent from the last whorl, where only obsolete impressed lines and microscopic spiral striation remain; axial sculpture only of incremental lines, concavely arcuate; aperture narrow, outer lip thin, sharp; throat brownish or white, pillar greenish white, with a wash of callus, twisted, recurved, pervious; operculum paucispiral, brownish. Lon. of shell, 27; of last whorl, 18; of aperture, 13; max. lat. of shell, 9 mm.

Station 5032, in 300 fathoms, Tsugaru Strait, Japan, September 30, 1906. U. S. Nat. Mus., 110,496.



**MOHNIA CLARKI** Dall, n. sp.

Shell small, plump, white, with a light green periostracum, usually much eroded, with about five whorls; apex defective in all the specimens; early whorls with (about eleven) small, arcuate, axial riblets, extending from suture to suture, obsolete or absent on the last whorl, their interspaces wider, shallow; no spiral sculpture; whorls flattish, suture distinct, not appressed; aperture white, body and pillar not callous; pillar twisted, nearly pervious; canal narrow, recurved; outer lip arcuate, thin, simple; operculum paucispiral. Lon. of shell (decollate), 21; of last whorl, 16.5; of aperture, 12 mm. Max. lat. of shell, 10.5 mm.

U. S. Nat. Mus., 110,497; at station 4797, in 682 fathoms, Okhotsk Sea, and 110,498, at station 4815, in 70 fathoms, off Hakodate, Japan.

A very simple, pretty little species which would seem when perfect to have rather a blunt apex, which is, however, eroded in every specimen. Named in honor of Mr. Austin H. Clark of the "Albatross" party.

Genus **VOLUTOPSIUS** Mörch**VOLUTOPSIUS MIDDENDORFFII** Dall, var. **EMPHATICUS**, nov.

Shell resembling *V. middendorffi* in form, size, and coloration, but heavier, thicker, with the spiral sculpture more emphatic, and broken irregularly by conspicuous incremental lines, so that its course forms a series of minute zigzags. These differences, which seem unimportant when analyzed, affect the general aspect of the shell to a disproportionate extent, so that at a first glance it seems very different. The differences between the type from the eastern part of Bering Sea and these from the west seem to hold good with all the specimens. Lon. of shell, 90; max. lat., 48 mm.

Station 4813, July 18, 1906, in 200 fathoms, Sea of Japan; 4804, June 24, in 229 fathoms Okhotsk Sea, and 4982, September 19, in 390 fathoms, Sea of Japan. U. S. Nat. Mus., 110,486 (types), 110,485, and 110,487.

**VOLUTOPSIUS? KENNICOTTI** Dall, var. **INCISUS**, nov.

Shell resembling *V. kennicotti* in nearly all features, but distinguished by the much deeper and sharper minute spiral grooving, which gives to the interspaces the aspect of minute crowded spiral threads; the axial ribs (about fifteen in number) are also notably prominent and strong. Lon. of shell, 75; max. lat., 35 mm.

Station 4779, in 54 fathoms, Bering Sea, June 9, 1906. U. S. Nat. Mus., 110,488.

The specimen is about half grown, but the difference in the sculpture is extreme. It came from the so-called Petrel Bank, in the western part of Bering Sea.

**VOLUTOPSIUS LIMATUS** Dall, n. sp.

Shell small, fusiform, periostracum milky gray in color over a chalky substratum, with about six turreted whorls, more or less eroded, but with a swollen nucleus and the operculum of *Volutopsis*; whorls plump, flattish in front of the suture, but with no angle or keel at the shoulder; surface with a smooth band near the suture, the remainder with fine spiral striæ; the interspaces flat except on the canal, where they are somewhat rounded, and the sulci widen to channels somewhat narrower than the intervening ridges; aperture elongate, livid purple within, a purple callus on the body, the pillar white; outer lip slightly expanded, simple, sharp; canal wide, recurved, axis not pervious. Lon. of shell, 62; of last whorl, 46; of aperture, 38; max. lat. of shell, 27; of aperture, 13.5 mm.

Station 5038, in 175 fathoms, and 5040, in 269 fathoms, off the south coast of Yesso. U. S. Nat. Mus., 110,493 and 110,492 respectively.

**VOLUTOPSIUS SIMPLEX** Dall, n. sp.

Shell large, thin, pale brown, with five or six whorls somewhat constricted at the suture; nucleus large, mammillate, of about two whorls; subsequent whorls rather convex, smooth, or marked only by irregularities of growth or incremental lines; profile fusiform, the last whorl largest but not expanded; outer lip arcuate, sharp, slightly thickened but not reflected; body without callus; pillar concave, curved to the right, twisted, short, with hardly a trace of a siphonal fasciole; canal short, wide, not recurved. Lon. of shell, 101; of last whorl, 80; of aperture, 57; maximum diameter of shell, 45; of aperture, 26 mm.

Station 4792, in 72 fathoms, off Bering Island, June 14, 1906. U. S. Nat. Mus., 110,475.

This is larger, thinner, smoother, and with a higher spire than any of the varieties of *V. castaneus* Mörch, which has a more irregular surface. *V. regularis* Dall is much smaller, relatively heavier, more regular, and of a different color.

**VOLUTOPSIUS (PYROLOFUSUS) HARPA**, var. **DEXIUS** Dall

Shell resembling the ordinary type, but with stronger and closer spirals and dextrally wound. Lon. of shell, 130 mm., the outer lip defective. ♀.

Station 4779, in 54 fathoms, Petrel Bank, Bering Sea, June 9, 1906. U. S. Nat. Mus., 110,484.

The dextral form of this species has not hitherto been known, though a dextral specimen of the *V. (P.) deformis* Gray, has been for some years in the national collection from the eastern part of Bering Sea. These dextral specimens are, however, of very great rarity.

Genus LIOMESUS Stimpson

**LIOMESUS BISTRIATUS** Dall, n. sp.

Shell small for the genus, very thick and solid, flesh-color and yellowish-white, with two smooth polished nuclear and three subsequent moderately inflated whorls, subtabulate at the shoulder; spire short-conic; sculpture of two or three sharply impressed spiral lines at the shoulder and on the base, with numerous almost microscopically fine spiral striæ, with a tendency to form fascicles of four or five each; shell in front of the suture flattish, but the tabulation not bounded by a keel; aperture short, wide; outer lip thick, white, simple, slightly expanded; body with a thin wash of callus; pillar short and thick, white, callous, shorter than the aperture, twisted, not pervious; canal very short, wide, recurved, with flaring edges. Lon. of shell, 18; last whorl, 14; of aperture, 11; max. lat. of shell, 12 mm.

Station 4809, in 207 fathoms, off Hakodate, Japan, July 16, 1906. U. S. Nat. Mus., 110,500.

A very neat, compact, and unique little species, in which it is likely the major incised lines may in some individuals extend over the larger part of the last whorl. Both specimens obtained were dead.

Genus TROPHON Montfort

Subgenus BOREOTROPHON Sars

**BOREOTROPHON ELEGANTULUS** Dall, n. sp.

Shell thin, pellucid white, with a nebulous brown band in front of the suture, one on the last whorl in front of the periphery and a third on the canal; elongate, acute, slender, the whorls of the spire rotund, looking like the spire of a *Scala*; suture distinct, with two nuclear (eroded) and five subsequent whorls; varices 10 to 12, very thin, sharp, reflected, patulous near the suture, but not coronate or spinose; early whorls with three or four distant obscure, spiral threads which later become obsolete; the surface also finely closely spirally striate; aperture elongate-oval, outer lip thin,

reflected; body with a wash of transparent callus, which is continued on the pillar as a thin elevated lamella continuous with the left-hand margin of the rather elongated and recurved canal; siphonal fasciole imbricate; interior of the aperture white, showing the color bands. Lon. of shell, 31.5; of last whorl, 23; of aperture and canal, 18; max. lat. of shell, including varices, 12.5 mm.

Station 4784, in 135 fathoms, off Attu Island, Aleutians, June 11, 1906. U. S. Nat. Mus., 110,501.

A very elegant and delicate species.

#### Genus *METULA* Adams

##### *METULA ELONGATA* Dall, n. sp.

Shell elongate, slender, cancellate, white, with seven or eight slightly convex whorls, with a minutely channeled suture; apex defective, subsequent whorls minutely regularly wholly cancellated by small flattish axial and spiral threads; the sculpture is a little stronger just in front of the suture and on the canal, elsewhere practically uniform; aperture long and narrow, with a shallow posterior sulcus; both lips thickened, the outer more or less crenulate; pillar straight; canal short, wide, slightly recurved. Lon. of shell (without the nuclear and apical whorls), 35; of last whorl, 23; of aperture, 16; maximum diameter last whorl, 9.5 mm.

Station 5071, in 57 fathoms, south coast of Nippon, Japan, October 15, 1906. U. S. Nat. Mus., 110,502.

Resembling *M. mitrella* Adams and Reeve, but much larger and of different proportions.

#### Genus *GALEODEA* Link (*CASSIDARIA* Lamarck)

##### *GALEODEA LEUCODOMA* Dall, n. sp.

Shell large, thin, white, with a short conical spire, having seven or more whorls; nucleus lost; subsequent whorls with the suture minutely channeled, the whorl in front of it flat, sloping to a shoulder formed by the first of four prominent straplike, prominently nodulous spirals (two of which appear between the sutures on the spire), which are separated by wider interspaces; on the last whorl there are about 25 of these similar and equal nodules; following these four there is a series of about 17 more similar but not nodulous spirals, which gradually decrease in size and approach each other more closely, until they are reduced on the canal to mere threads; beside these the interspaces have numerous smaller subequal spiral

threads; all are crossed and faintly reticulated by well-marked incremental lines, which sometimes form wrinkles near the suture; aperture milk-white, the outer lip thickened, strongly reflected, and on the inner edge of the thickening obscurely crenulate; body with a thin coating of callus with a few nodulations near the junction with the outer lip; pillar callous, arcuate, concave, its anterior edge obliquely twisted, forming a pervious axis; canal short, recurved with a short fasciole; operculum brown, ovate, with a paucispiral nucleus surrounded by concentric structure, the nucleus to the right of the center of the anterior third. Lon. of shell, 67; of last whorl, 58; of aperture, 50; of operculum, 25; max. lat. of shell, 50 mm.

Station 4912, in 391 fathoms, August 12, 1906, off Kagoshima, Japan. U. S. Nat. Mus., 110,503.

This fine and elegantly sculptured species is perhaps nearest to the *G. echinophora* of the Mediterranean, from which it is distinguished by numerous characters, the most conspicuous of which, perhaps, is the absence of any raised lamella on the pillar and canal.

Genus *ASTRÆA* Bolten, 1798 (*ASTRALIUM* Link, 1807)

*ASTRÆA PERSICA* Dall, n. sp.

Shell small, conic, whorls overhanging the suture and about five in number; ground color a creamy yellow with radiating flammules of very dark purple, grading off on the anterior side to crimson and rose pink, separate tubercles having dark color giving the effect of dots; early whorls with, on the upper surface, five beaded spirals, between which on the later whorls are intercalated one or more much smaller beaded or simple threads; these are crossed obliquely by small, sharp, imbricated lamellæ, visible only under a lens; at the periphery the thin keel is produced into narrow, guttered spines with two or three radial threads on each; base elegantly flammulate with dark purple, sculptured like the upper side, having one strong nodulous and seven or eight smaller spirals and the same imbricate minor sculpture; the peripheral keel should have, when intact, about 20 spines; umbilical region smoothly covered with a milk-white callus; aperture rounded, the outer lip leading at the suture, which is laid on the prominent basal spiral before mentioned, aperture white except where the color markings show through the glaze. Alt. of shell, 20; maximum diameter, excluding spines, 22; diameter of aperture, 10 mm. The operculum was not preserved.

Station 4936, in 103 fathoms, off Kagoshima Bay, Japan, August 16, 1906. U. S. Nat. Mus., 110,507.

The coloration of this exquisite little shell reminds one of the

delicate pattern of a fine Persian rug. The spines when perfect are about 4 mm. long. There is no species noted in the monographs to which it is at all closely allied specifically.

Genus *BASILISSA* Watson

*BASILISSA BABELICA* Dall, n. sp.

Shell large, white, acutely conic, with about twelve whorls; apex defective, early whorls convex, with a peripheral row of nodules, which, in successive whorls, descends to the level of the suture which it overhangs, developing into a marked keel, which, at first nodulous, becomes later merely crenate; sides of the whorls, except near the apex, flat; the base almost flat, the whole surface finely and closely spirally striate; incremental lines between the sutures gently concave forward; base compressed at the peripheral keel, within which it is slightly convex to a keel which borders a deep, 5 mm. wide funicular umbilicus with vertically striate walls; incremental lines of the base sweeping forward from the peripheral keel and receding to the umbilical keel; aperture roughly quadrate, with a continuous thin, sharp margin, which exhibits a sulcus corresponding to the umbilical keel and angles at the suture and peripheral keels; the basal margin leads the others when intact; operculum horny, pale yellow, externally concave, with a somewhat ragged periphery and about four whorls. Alt. of shell, 37; of aperture, 8; maximum diameter of shell, 25; of aperture, 12 mm.

Station 4972, in 440 fathoms, and 4973, in 600 fathoms, August 30, 1906, off Yokohama, Japan. U. S. Nat. Mus., 110,504 and 110,505.

This is the largest and most striking species yet described. *B. superba* Watson comes nearest to it, but is much smaller and less attenuated.

In the same cast was obtained *Leptothyra* (*Phanerolepida*) *transenna* Watson, which I separate from the typical *Leptothyras* on account of the absence of spiral sculpture, the peculiar shagreen-like surface, and the operculum, in which the whorls are not, as in the typical *Leptothyra*, visible externally and flat, but are concealed by a callous deposit and have a concave surface. These features, as such things go, are at least sufficient for sectional distinction.

Genus *MICROGAZA* Dall

*MICROGAZA FULGENS* Dall, n. sp.

Shell larger than *M. rotella* Dall, but of much the same general aspect; depressed turbinata, brilliantly polished, very thin, the pearly

luster shining through a very thin yellowish periostracum, the upper surface painted with a pale brown zigzag nebulous coloration; nucleus globular of a single whorl, pale, followed by five subsequent whorls moderately convex, with obsolete incremental and spiral markings; periphery rounded, base uniformly pale, the convexity equal to that of the upper surface of the whorl, with a large, completely pervious, vertical-sided umbilicus, with a rectangular margin; the keel of the umbilicus is crenate by short radial grooves, which also extend up the sides of the funnel and are sharply reticulated there by four or five sharp spiral grooves; aperture ample, the upper part of the outer lip produced, making the plane of the aperture oblique; remainder of the margin rounded except at the umbilical keel and where the body interrupts the thin sharp peristome; interior pearly; operculum thin, concave, yellowish, with about eight whorls. Alt. of shell, 6; maximum diameter, 10; minimum diameter, 8 mm.

Sea of Japan, at station 4891, 1906. U. S. Nat. Mus., 110,543.

#### Genus COCCULINA Dall

##### COCCULINA JAPONICA Dall, n. sp.

Shell small, white, elevated, finely, sharply, radiately striated, the apex recurved; anterior slope convexly arcuate, longer; posterior slope direct, sloping, shorter; periostracum very thin, pale yellowish; interior smooth, white; margin thin, nearly equally rounded at both ends. Lon. of shell, 8.2; lat., 6; alt., 3.5; the apex behind the anterior end, 7 mm.

Off Sado Island, Sea of Japan, at station 4813. U. S. Nat. Mus., 110,544.

This is the first record of the genus from the Sea of Japan.

#### Genus DENTALIUM Linné

##### DENTALIUM CROCINUM Dall, n. sp.

Shell solid, reddish yellow, smooth, polished, without sculpture except incremental lines; diameter rather rapidly increasing; anal aperture entire, circular; also the anterior aperture; shaft arcuate. Lon. of shell (chord), 39; diam., post., 1; ant., 5 mm.

Station 5094, Gulf of Tokio, Japan, in 88 fathoms. U. S. Nat. Mus., 110,508.

This is nearest *D. longistrorsum* Reeve, but increases more rapidly in caliber and probably does not attain so great a length.

## Genus NUCULA Lamarck

## NUCULA MIRIFICA Dall, n. sp.

Shell olive brown, with a brilliantly polished periostracum, obscurely microscopically radially striate or smooth, with faint concentric incremental irregularities; beaks low and inconspicuous, prosocelous, very anterior; general outline egg-shaped, the short anterior end obscurely truncate, lunule and escutcheon absent, though there is a slight depression under the beaks without definite limits; interior nacreous white, the margins entire, pallial line and muscular impressions distinct but not deep; hinge line evenly arcuate, divided by a large, obliquely directed chondrophore; teeth of the anterior series crowded, 10 to 11 in number; posterior series with 16 to 17 less crowded prominent teeth. Alt., 26; lon., 36; diam., 16 mm., the vertical of the beaks 6 mm. behind the anterior extremity of the valves.

U. S. S. *Albatross*, station 5040, south coast of Yesso, October 3, 1906, in 269 fathoms. U. S. Nat. Mus., 110,463.

This appears to be the largest smooth and typical *Nucula* yet described, though a specimen of *Acila mirabilis* Adams and Reeve, was obtained at station 4994, in 190 fathoms, which measured 41 mm. long, 29 mm. high, and 22 mm. in diameter.

## Genus PECTEN Muller

## PECTEN (CHLAMYS) ERYTHROCOMATUS Dall, n. sp.

Shell resembling *P. hericcus* Gould and *P. islandicus* Muller in general appearance, but differing in the following details. Than *islandicus* it is somewhat more rounded in the disk and more convex; the anterior ears are smaller and more vertically truncate distally; the hinge line is shorter and the posterior ears smaller and the byssal fasciole narrower; the radii are smaller, keeled and minutely spinose instead of smooth and flat on top and laterally rounded; the minor reticular sculpture is more oblique and rough, the channels between the radii relatively wider; the radii themselves are gathered obscurely into fascicular bundles, which as a whole are raised like wide obsolete ribs; the colors are obscurely radial, rose-red and white instead of mainly concentrically distributed. Than *hericcus* the hinge-line is more horizontal and the anterior ears much smaller, the byssal fasciole much narrower, the minor sculpture more rasp-like, the individual spinules straight distally instead of arcuate, the larger riblike fasciculi very much less distinct, only five or six in



number against about 18 in *hericeus*; the interior is less colored. Alt., 69; lon., 70; diameter, 24; lon. of hinge line, 32 mm.

U. S. S. *Albatross*, station 5021, Okhotsk Sea, September 27, 1906, in 73 fathoms. U. S. Nat. Mus., 110,462.

The lower valve is white, but its sculpture similar to that of the upper valve. The station is on the east coast of Sakhalin Island.

#### Genus CRENELLA Brown

##### CRENELLA GRISEA Dall, n. sp.

Shell thin, oblique, elongate, rounded-quadrate when adult, the young specimens relatively shorter; surface of a grayish olivaceous color, with lighter and darker zones, brilliantly polished, with faint, irregular traces of fine obsolete radial striation; beaks inconspicuous, hinge line gently arcuate, with a minutely denticulate small lamella directly under the beaks; the margin behind the beaks with narrow internal elongate ligament, behind which are sharp minute interlocking denticulations of the margin, beyond which the margin is minutely crenulate; interior bluish perlaceous; hinge line behind the beaks slightly rounded and produced, but not quite angulate. Longest extension of shell, 12; dimension at right angles to this, 8.5; diameter, 7 mm.

U. S. S. *Albatross*, stations 4782, off east end of Attu Island, June 9, and 4784, June 11, 1906, in 57 and 135 fathoms respectively. U. S. Nat. Mus., 110,464 and 110,465.

Peculiarly shaped and colored, but not identical, as far as can be told, with any of A. Adams' imperfectly described nominal species.

##### CRENELLA DIAPHANA Dall, n. sp.

Shell large for the genus, tumid, extremely thin, elongate-ovate, pale horn-color, finely minutely radially sculptured, the interspaces channeled distally, but narrower than the radii; beaks prosocoelous, prominent; hinge line very short, the valves nearly equilateral, the sides similar, the base medially produced; internal ligament strong, anteriorly divided, the margins minutely crenulate, but not interlocking, except immediately under the beaks; alt., 18; lon., 14; diameter, 13 mm.

U. S. S. *Albatross*, station 5092, October 26, 1906, in 70 fathoms, Gulf of Tokio. U. S. Nat. Mus., 110,466.

The shell is so equilateral that it looks like the dorsal valve of a delicately sculptured *Terebratulina*.

## Genus MODIOLARIA Beck

**MODIOLARIA IMPRESSA** Dall, n. sp.

Shell small, thin, arcuate, elongate, olive-green or brownish, with a small striate anterior area, deeply impressed middle area, and large, tumid, nearly smooth posterior area; surface polished, beaks very anterior, inconspicuous; anterior area very short, with about six pairs of strong radial riblets; middle area polished, smooth, gaping below for the byssus, where the margin is a little convex, behind which it is conspicuously excavated; posterior area swollen, arcuate above, produced behind and below, dropping vertically to meet the depressed middle area, faintly concentrically and obsoletely minutely radially striated; interior pearly; inner margins crenulate around the distal areas, medially smooth, with a few interlocking denticulations just behind the internal ligament, but none in front of the beaks; byssus strong. Alt., 10; lon., 19; maximum diameter, 9 mm.

U. S. S. *Albatross*, station 4677, June 5, 1906, in 52 fathoms, Bering Sea. U. S. Nat. Mus., 110,467.

Peculiar on account of the strong constriction of the middle areas and the arcuate form.

## Genus LIOCYMA Dall

**LIOCYMA ANIWANA** Dall, n. sp.

Shell small, solid, pale grayish or straw-color, with low, rather anterior beaks; anterior end short, rounded; posterior end longer, attenuated; base evenly arcuate; about two-thirds of the valve with strong concentric waves with subequal interspaces, the remainder concentrically striated; interior bluish white, with the middle of the disk yellowish; pallial sinus very short; hinge normal, heavy. Lon. of shell, 24; alt., 18; diameter, 13 mm. Vertical of the beaks about seven mm. behind the anterior end; the beaks somewhat eroded.

Station 5013, in 43 fathoms, Aniwa Bay, at the south end of Sakhalin Island. U. S. Nat. Mus., 110,511.

Ruder, more inflated and solid, and more attenuated behind than any of the arctic or Aleutian species.

## Genus PHOLADOMYA Sowerby

**PHOLADOMYA PACIFICA** Dall, n. sp.

Shell thin, whitish, more or less minutely granular on the exterior surface, with a very thin pale yellowish periostracum, equivalve, nearly equilateral; form resembling that of *Mya arenaria*, but pro-

portionately more inflated; anterior end rounded, posterior slightly attenuated; hinge-line nearly straight, base arcuate; sculpture of (on the middle of the disk, 10 or 12) rounded, moderately elevated, radial ridges with wider interspaces near the base, but crowded near the beaks; the periostracum near the end of the shell exhibits minute radial wrinkles, but the terminal fourths of the valves are destitute of sculpture except faint concentric irregularities. Interior smooth, slightly pearly, with a shallow rounded pallial sinus and faint muscular scars; basal margins crenulated by the sculpture, thin, sharp; hinge typical, ligament and resilium weak. Lon. of largest valve, 48; of pair, 44; alt., 30; diam., 25 mm.

Station 4807, off Hakodate, in 44 fathoms, and station 4904, in 107 fathoms, near Nagasaki, Japan. U. S. Nat. Mus., 110,545 and 110,456.

This is the first recent species, which has been brought to notice since the description of the Antillean *P. candida* in 1823, except a minute abyssal form from the North Atlantic.